

REMARKS

Claims 3, 4 and 7-12 remain in the application.

The present invention is directed to a multiple frequency response Helmholtz resonator for use with a multi-speed engine system to achieve noise attenuation at different engine operating speeds. For a Helmholtz resonator to function it must be acoustically coupled to the noise source. As stated at page 5, lines 6 and 7, "(c)hamber 50-B is always in communication with inlet pipe 22 via neck 50-1" (emphasis supplied). At page 5, line 17, it states "(n)eck 150-1 is always connected to chamber 150-A" (emphasis supplied).

At page 6, lines 7 and 8 it states "(c)hamber 250-B is always in communication with inlet pipe 222 via neck 250-1" (emphasis supplied). So, it should be clear that all embodiments are always operative as Helmholtz resonators since they are not turned on or off, just the frequency response is changed. The frequency response is changed by: (1) changing the cross section of the restricted path(s) connecting the resonator to the noise source; (2) changing the length of the restricted path(s); and/or (3) changing the volume of the chamber of the Helmholtz resonator. Passages/necks 50-1, 150-1 and 250-1 continuously connect the Helmholtz resonators to the inlet line whereas passages/necks 150-2, 150-3, 250-2 and 250-3 selectively connect the Helmholtz resonators to the inlet line under the control of valve 152 (Figures 4-6) or valve 262 (Figure 7 and 8).

The present invention modifies the volume and/or the neck area of a single Helmholtz resonator to change the frequency range to which the resonator is responsive. This does not turn the Helmholtz resonator on or off. The changes in volume and neck area are achieved through valves (52; 152; 252, 262). The use of the term "valve" is explained in the Specification at page 4, lines 16-19 and is based on the structural similarities although there is no net flow into or out of the closed chamber defining the Helmholtz resonator.

Jessberger (U.S. Patent 6,494,290) discloses a plurality of embodiments. In the embodiment of Figure 1, the device can be assembled with tubes of length 3a or 3b - thus the frequency response is not variable without reassembly. In the embodiment of Figures 2 and 3, flow paths having cross sectional areas of zero, A1, A2, and A1 plus A2 are disclosed but there is no change in chamber volume nor is there continuous communication through a single restricted connection. In the embodiment of Figure 4, wall 15 is movable to vary the volume of the resonator. The Examiner has specifically relied on the embodiment of Figures 2 and 3 which is specifically described at column 3 lines 8-24. Specific attention is directed to column 3 lines 12-14 where it states that "a pivotable flap 10 is mounted with which the openings 5 and 6 can be alternately closed and opened, or both can be opened or closed" (emphasis supplied). No embodiment discloses plural restricted paths with one path always open or plural paths in combination with a variable volume.

Claims 3, 4 and 7-12 stand rejected under 35 U.S.C. 112, second paragraph. The Examiner has pointed out deficiencies with respect to independent claims 3, 7 and 9. However, in reviewing the claims in view of the Examiner's remarks it became clear that all of the claims have the same deficiency. Accordingly, all of the claims have been amended. It is believed that the amendments also correct any deficiencies in Applicant's Supplemental Paper.

Claims 3, 7 and 9 stand rejected under 35 U.S.C. 102(e) as anticipated by Jessberger (U.S. Patent 6,494,290). At column 3, lines 12-14 it states that "a pivotable flap 10 is mounted with which the openings 5 and 6 can be alternately closed and opened, or also both can be opened or closed." In Figure 2, flap/valve 10 is shown blocking tubular connections 7 and 8. In the Figure 2 position the Helmholtz resonator will not suppress noise since only tubes 7 and 8 are connected to duct 1 and they are only a part of an operative Helmholtz resonator. Also, it will be noted that neither of the tubes 7 and 8 always provides a connection to volume V when the Helmholtz resonator is operative.

Claims 3 and 7 each recite "a Helmholtz resonator continuously operatively connected to said inlet line via a restricted connection" and "one restricted connection which is selectively connected between said chamber and said inlet line". The terms "continuously" and "selectively" distinguish the two recited restricted connections. The first definition of "continuous" is Webster's New World College Dictionary, Fourth Edition is "going on or extending without interruption or break; unbroken; connected". This is the definition that defines neck 50-1, neck 150-1 and neck 250-1 as illustrated, described, claimed, and as argued by Applicant's attorney.

Jessberger, at column 3 lines 8 and 9 and 13 and 14 states that "there are two openings 5 and 6 for tubular connections 7 and 8" and that "the openings 5 and 6 can be alternately closed and opened or both can be opened or closed". Thus , Jessberger does not distinguish between the operations of tubes 7 and 8 other than either one can be the open tube when only one tube is open. In reading Jessberger against claims 3 and 7, the Examiner states that "(the restricted connection (7) is always or continuously connected to the closed chamber (emphasis supplied); the restricted connection (7), even though in only periodic fluid communication with the closed chamber, is always in operation to reduce noise in the air inlet line when the engine is in operation)". This is contrary to the definition of continuous since each of the restricted connections is valved and is contrary to the disclosure of Jessberger since connection 7 is not always connected to the inlet line when the engine is in operation since only tube 8 may be in communication to provide the proper response. Other than their cross sections, there is nothing to distinguish tubes 7 and 8 such as one being "continuously" and one being "selectively" connected as required by the claims.

Claim 9 also recites "a Helmholtz resonator continuously operatively connected to said inlet line via a restricted connection" and "a valve having only an open and a closed position". As in the case of claims 3 and 7, the Examiner has read restricted connection 7 of Jessberger as "always or continuously connected t the closed chamber" and is incorrect for the reasons discussed with respect to claims 3 and 7. As stated at column

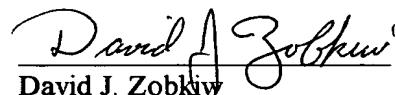
3, lines 12-14 "a pivotable flap 10 is mounted with which the openings 5 and 6 can be alternately closed and opened, or also both can be opened or closed". Stated otherwise (1) only opening 5 is open; (2) only opening 6 is open; (3) both openings 5 and 6 are open; and (4) both openings 5 and 6 are closed. The claim requires "only an open and a closed position" which requires that there only be two positions which is possible since, unlike Jessberger, the present invention requires a continuously operatively connected/unvalved restricted connection. Therefore, Jessberger fails to disclose the required continuous connection and a valve having only two positions.

A central point of dispute seems to be the meaning of the word "continuously". I believe that a normal definition of "continuously" is being uninterrupted and that the Specification, drawings and claim language and arguments presented are consistent with that definition. If not convinced by the arguments presented, I would greatly appreciate it if the Examiner would suggest any language acceptable to him which means any argued meaning of "continuously".

Reconsideration of the rejection of claims 3, 4 and 7-12 is respectfully requested. As noted above, Jessberger does not disclose "a Helmholtz resonator continuously operatively connected to said line via a restricted connection", as required by the claims.

For the reasons set forth above, it is believed that claims 3, 4 and 7-12 are now in condition for allowance and such action is respectfully requested.

Respectfully submitted,
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